



Sample questions MRCP I 2018

Question 1

A 65-year-old woman presented with a 12-hour history of the sudden onset of gait unsteadiness, vomiting and headache, followed by increasing drowsiness.

What is the most likely diagnosis?

Question 1

- ☐ A: acute cerebellar haemorrhage
- ☐ B: acute subdural haemorrhage
- ☐ C: frontal subdural empyema
- ☐ D: herpes simplex encephalitis
- ☐ E: pituitary apoplexy

Correct answer: A

Explanation

The sudden onset suggests a vascular cause and the rapid worsening with drowsiness suggests an expanding space-occupying lesion with rising intracranial pressure and risk of herniation. The description is classical for a cerebellar haemorrhage which, by its location in the posterior fossa, causes this clinical scenario. It is a neurological emergency requiring rapid identification.

Question 2

A post-marketing observational study of a new drug was conducted on 5000 patients following clinical trials.

What best describes the data generated from this type of study?

Question 2

- ☐ A: comparative efficacy
- ☐ B: cost-benefit
- ☐ C: cost effectiveness
- ☐ D: potency
- ☐ E: profile of adverse effects

Correct answer: E

Explanation

Post-authorisation safety studies (PASS) are observational (non-randomised) studies conducted after a new drug is introduced into clinical use to characterise the adverse-effect profile, particularly in patients not studied during clinical trials e.g. liver and renal disease, pregnancy, children etc

Question 3

A 79-year-old woman was admitted for elective hip replacement surgery.

On examination, she was pale. There was 2-cm splenomegaly and there were small discrete axillary lymph nodes.

Investigations:

haemoglobin	107 g/L (115–165)
white cell count	$34.5 \times 10^9/\text{L}$ (4.0–11.0)
platelet count	$183 \times 10^9/\text{L}$ (150–400)

What is the most likely diagnosis?

Question 3

- ☐ A: acute myeloid leukaemia
- ☐ B: chronic lymphocytic leukaemia
- ☐ C: chronic myeloid leukaemia
- ☐ D: myelodysplasia
- ☐ E: myelofibrosis

Correct answer: B

Explanation

The presence of splenomegaly, anaemia and lymph nodes would make chronic lymphocytic leukaemia the more likely possibility. Highly desirable to have differential counts showing small lymphocyte

Question 4

A 17-year-old boy presented with a non-blanching rash over his legs, a swollen knee and painless, visible haematuria.

Urinalysis showed blood 3+, protein 1+.

Investigations:

serum creatinine	210 µmol/L (60–110)
urine culture	negative
ultrasound scan of kidneys	normal

What glomerular abnormality is most likely to be present at renal biopsy?

Question 4

- ☐ A: focal and segmental sclerosis
- ☐ B: foot process fusion
- ☐ C: linear deposition of IgG on the basement membrane
- ☐ D: mesangial deposition of IgA
- ☐ E: thickening of basement membranes

Correct answer: D

Explanation

Typical presentation of IgA vasculitis (Henoch–Schönlein purpura). The IgA is seen on immunofluorescence.

Question 5

A 75-year-old woman developed a spreading cellulitis on her left leg secondary to ulceration.

Investigations:

blood c\s	MRSA
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In addition to vancomycin, what is the most appropriate antibiotic?

Question 5

- ☐ A: amoxicillin
- ☐ B: azithromycin
- ☐ C: flucloxacillin
- ☐ D: metronidazole
- ☐ E: rifampicin

Correct answer: E

Explanation

Rifampicin and vancomycin combination lead to synergistic effects against MRSA

Question 6

A 45-year-old woman presented with right flank pain. She had a 4-year history of hypertension and progressive cognitive impairment.

On examination, she had livedo reticularis and tenderness in the right flank. Her blood pressure was 185/105 mmHg. Urinalysis showed blood 3+, protein 1+.

Investigations:

haemoglobin	129 g/L (115–165)
white cell count	$8.7 \times 10^9/\text{L}$ (4.0–11.0)
platelet count	$83 \times 10^9/\text{L}$ (150–400)
serum creatinine	106 $\mu\text{mol/L}$ (60–110)

What antibody test is most likely to be positive?

Question 6

- ☐ A: anticardiolipin
- ☐ B: anticentromere
- ☐ C: anti-glomerular basement membrane
- ☐ D: antimitochondrial
- ☐ E: anti-neutrophil cytoplasmic

Correct answer: A

Explanation

She has antiphospholipid syndrome and presented with probable renal vein thrombosis to account for her flank pain. The other features are also typical of this condition. Options B–E are not typical of this presentation

Question 7

A 37-year-old woman presented with a history of intermittent lightheadedness.

Examination was normal.

Investigations:

ECG	normal
24-hour ECG tracing (Holter monitor)	atrial and ventricular premature beats; nocturnal bradycardia and Mobitz type 1 atrioventricular block, and supraventricular tachycardia

Which abnormality on the 24-hour ECG is clinically most important?

Question 7

- ☐ A: atrial premature beats
- ☐ B: profound sleep-associated bradycardia
- ☐ C: supraventricular tachycardia
- ☐ D: transient Mobitz type 1 atrioventricular block
- ☐ E: ventricular premature beats

Correct answer: C

Explanation

C: Supraventricular tachycardia is the best answer. It would provide a plausible explanation for the patient's symptoms, and may merit specific treatment (either drugs or ablation).

A: Atrial premature beats or ectopic beats are generally a benign finding, and do not usually require specific treatment (although they can cause symptoms).

B: Nocturnal bradyarrhythmia is irrelevant to the patient's presenting symptoms, and is a common finding in normal individuals.

D: Transient Wenckebach atrioventricular block is a well-recognised finding in young healthy individuals and does not usually require treatment.

E: Ventricular premature beats or ectopic beats are a common incidental finding, and do not usually require treatment (although they can cause symptoms). Frequent and multifocal ventricular ectopic beats can, however, sometimes be a marker for more serious underlying cardiac pathology (e.g. ischaemic heart disease or cardiomyopathy).

Question 8

A 28-year-old man presented with a 1-month history of weight loss, abdominal distension, flatulence and foul-smelling diarrhoea following a visit to India.

Investigations:

anti-tissue transglutaminase antibodies

stool cultures and microscopy

What is the most likely diagnosis?

Question 8

- ☐ A: acute HIV seroconversion illness
- ☐ B: coeliac disease
- ☐ C: giardiasis
- ☐ D: hookworm infection (ancylostomiasis)
- ☐ E: viral gastroenteritis

Correct answer: C

Explanation

The chronicity of the diarrhoeal symptoms and the travel history to an endemic area makes giardiasis the most likely diagnosis. Stool cultures are often falsely negative in giardiasis. Coeliac disease is much less likely as anti-tissue transglutaminase antibodies are negative. Viral gastroenteritis is unlikely to be so chronic. Acute HIV and hookworm rarely present in such a fashion and are less plausible than giardiasis.

Question 9

A 30-year-old woman presented with a 6-month history of tremor and difficulty in speaking.

On examination, she was found to have increased muscle tone in all four limbs, bradykinesia and 4-cm hepatomegaly.

What laboratory finding would best support a diagnosis of Wilson's disease?

Question 9

- ☐ A: increased incorporation of radioactive copper into caeruloplasmin
- ☐ B: low hepatic copper content
- ☐ C: low serum caeruloplasmin concentration
- ☐ D: low serum copper concentration
- ☐ E: low urine copper concentration

Correct answer: C

Explanation

Wilson's disease is an autosomal recessive disorder of copper metabolism. Copper accumulation in tissue commonly presents with hepatic, neurological and psychiatric signs and symptoms. Levels of caeruloplasmin are low in most, but not all, cases. Hepatic, serum and urine copper levels are all elevated. Caeruloplasmin is the molecule by which about 95% of copper is normally carried. In those affected by Wilson's disease, absence of ATP7B, also known as the Wilson's disease protein, means caeruloplasmin cannot be correctly synthesised in hepatocytes, resulting in an effective absence in serum

Question 10

What dietary substrate is broken down into glucose and galactose by the action of intestinal enzymes?

Question 10

- ☐ A: fructose
- ☐ B: lactose
- ☐ C: maltose
- ☐ D: mannose
- ☐ E: sucrose

Correct answer: B

Explanation

Lactose is a disaccharide which contains galactose and glucose. Maltose is a disaccharide, composed of glucose molecules. Glucose and fructose combine to form sucrose. Fructose is a monosaccharide and maltose is an aldohexose monomer.

Question 11

A 16-year-old girl presented with non-scaly, discrete areas of hair loss on the scalp. She had a past history of atopic eczema and had a number of depigmented areas on her hands and around her eyes.

What is the most likely diagnosis?

Question 11

- ☐ A: alopecia areata
- ☐ B: hypothyroidism
- ☐ C: lupus erythematosus
- ☐ D: seborrhoeic dermatitis
- ☐ E: trichotillomania

Correct answer: A**Explanation**

Alopecia areata is an immunologically-based disorder where there are discrete areas of hair loss but without scarring or scaling, and patients with this condition have a higher incidence of atopic eczema, hence A is correct. In lupus erythematosus, there is usually active inflammation with scarring, whereas in trichotillomania there are residual short hairs at the affected site, frequently of the same length, because the patient generally finds it difficult to pull the shorter newly growing hairs. Hypothyroidism can give patchy hair thinning with brittle, straw-like hair and bald patches, along with other symptoms of hypothyroidism (e.g. weight gain, constipation, etc.). Seborrhoeic dermatitis generally gives diffuse scaling on the scalp without hair loss; although it can cause some areas of hair loss, this would be associated with scaling of the scalp.

Question 12

A 72-year-old man presented following an episode of collapse. There had been two similar episodes recently, each lasting about 1 minute. He had had an anterior myocardial infarction 4 years previously.

On examination, he was orientated and symptom free with a regular pulse of 80 beats per minute. His blood pressure was 140/80 mmHg and the apex beat was displaced to the left. There was an apical systolic murmur. There were no signs of trauma.

Investigations:

ECG	sinus rhythm; anterior Q waves and anterior ST-segment elevation without reciprocal depression
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What is the most likely diagnosis?

Question 12

- ☐ A: acute anterior myocardial infarction
- ☐ B: cerebral embolism
- ☐ C: epilepsy
- ☐ D: pulmonary embolism
- ☐ E: ventricular tachycardia

Correct answer: E

Explanation

E: Ventricular tachycardia is the best answer. The description of collapse is not comprehensive, but there have been several short-lasting, self-limiting episodes suggestive of cardiogenic syncope. The patient has a history of myocardial infarction, has clinical evidence of cardiomegaly, and has an ECG typical of left ventricular aneurysm (persistent ST elevation with Q waves). In this situation, ventricular tachyarrhythmia would be high on the differential list.

Bradyarrhythmia would be a plausible alternative, but is not given as an option here.

A: The history of recurrent collapse is not suggestive of acute myocardial infarction.

B: This patient would be at fairly high risk for cerebral embolism, but this does not commonly present with isolated or recurrent syncope.

C: Epilepsy generally presents with more protracted loss of consciousness, and other features such as aura, posture and tone abnormalities, tongue-biting and incontinence, post-ictal confusion are not present here.

D: Pulmonary embolus is another plausible though less frequent cause of collapse. There is no mention of chest pain or dyspnoea, however, and there are no particular risk factors, so it would be a less likely cause than arrhythmia in this case.

Question 13

A 26-year-old woman presented with unequal pupils.

On examination, the right pupil was larger than the left and did not react to light, directly or consensually. On convergence, the right pupil reacted very slowly, but eventually became smaller than the left pupil.

What is the best description of this type of pupillary abnormality?

Question 13

- ☐ A: Adie's tonic pupil
- ☐ B: afferent pupillary defect
- ☐ C: Argyll Robertson pupil
- ☐ D: Horner's syndrome
- ☐ E: third cranial nerve palsy

Correct answer: A

Explanation

Adie's tonic pupil (Holmes Adie) is characterised by pupil dilatation (on the right) with delayed response to light and a more definite response to accommodation. It is typically seen in young women and may be associated with reduced ankle or knee jerks and impaired sweating.

Question 14

A 45-year-old man had recurrent nephrolithiasis. Renal function tests and serum calcium measurements were normal.

Investigations:

24-h urinary calcium	8.8 mmol (2.5–7.5)
24-h urinary urate	3.0 mmol (<3.6)
24-h urinary oxalate	0.20 mmol (0.14–0.46)
24-h urinary citrate	0.2 mmol (0.3–3.4)

What is the most useful therapy to reduce stone formation?

Question 14

- ☐ A: allopurinol
- ☐ B: bendroflumethiazide
- ☐ C: dietary calcium restriction
- ☐ D: penicillamine
- ☐ E: potassium citrate

Correct answer: E

Explanation

The 24-h urinary calcium is marginally elevated and is not an indication for thiazide diuretic therapy. Urinary citrate reduces urinary supersaturation of calcium salts by forming soluble complexes with calcium ions, and by inhibiting crystal growth and aggregation, hence its use in recurrent stone formers. There is no data to warrant use of allopurinol (for acute uric acid nephropathy) or penicillamine. Low calcium diets lead to increased oxalate absorption production, which is counterproductive

Question 15

A 38-year-old woman required extraction of her wisdom teeth. She gave a history of haemorrhage after a dental extraction 10 years previously, when she had required suturing. There had been no history of excessive bleeding before this.

What is the most likely diagnosis?

Question 15

- ☐ A: factor V Leiden
- ☐ B: factor IX deficiency
- ☐ C: factor XII deficiency
- ☐ D: primary antiphospholipid syndrome
- ☐ E: von Willebrand's disease

Correct answer: E**Explanation**

The question stem implies that there is a longstanding tendency to bleed following dental extraction. The answer list requires the candidate to select the most likely disorder which could explain this bleeding.

Von Willebrand's disease (answer E) is the correct answer as this is a relatively common bleeding disorder that may manifest in adults with excessive bleeding after dental extractions or other minor surgical procedures. On further questioning of female patients, there is often a history of menorrhagia.

Factor V Leiden (answer A) is not correct as this is an inherited disorder which is associated with an increased risk of thrombosis, not bleeding.

Factor IX deficiency (answer B) is an X-linked recessive disorder and would not be expected to affect females. Factor IX deficiency would also not be expected to present in a 38-year-old patient.

Factor XII deficiency (answer C) is a rare autosomal recessive condition that is not associated with a bleeding tendency in the majority of cases, although it is associated with a marked prolongation of the activated partial thromboplastin time and may, incorrectly, be assumed to influence bleeding risk.

Primary antiphospholipid syndrome (answer D) is associated with a tendency to thrombosis, not bleeding.

Question 16

A 30-year-old man presented with increasing breathlessness and wheeze. He smoked 5 cigarettes per day.

Investigations:

serum α_1 -antitrypsin	0.12 g/L (1.1–2.1)
forced expiratory volume in 1 s	0.85 L (3.4–5.1)
forced vital capacity	4.75 L (4.2–6.5)
transfer factor for CO (TL_{CO})	4.1 mmol/min/kPa (7.1–12)

Which protease inhibitor genotype is most likely to be present?

Question 16

- ☐ A: MM
- ☐ B: MZ
- ☐ C: SS
- ☐ D: SZ
- ☐ E: ZZ

Correct answer: E

Explanation

Very low α 1-antitrypsin levels, associated with severe obstructive airways disease.

Question 17

A 35-year-old woman with early stage IV chronic kidney disease was being considered for erythropoietin therapy; her glomerular filtration rate was 15–29 mL/min (70–140) .

On examination, her blood pressure was 140/90 mmHg and she had an arteriovenous fistula in situ for planned haemodialysis.

Investigations:

haemoglobin	95 g/L (115–165)
MCV	84 fL (80–96)

What is the most likely outcome of erythropoietin therapy?

Question 17

- ☐ A: improved blood pressure control
- ☐ B: improved exercise tolerance
- ☐ C: increased ventricular hypertrophy
- ☐ D: reduced likelihood of red cell aplasia
- ☐ E: stabilisation of renal function

Correct answer: B

Explanation

Epoetin therapy will raise her haemoglobin and allow more oxygen delivery to her tissues for better exercise tolerance.

Question 18

A 54-year-old woman, who had undergone subtotal thyroidectomy for Graves' disease 20 years previously, presented for a review. She was well.

Investigations:

serum cholesterol	6.8 mmol/L (<5.2)
serum HDL cholesterol	1.10 mmol/L (>1.55)
serum thyroid-stimulating hormone	16.2 mU/L (0.4–5.0)
serum free T4	13.0 pmol/L (10.0–22.0)

What is the most appropriate initial treatment for her hyperlipidaemia?

Question 18

- ☐ A: bezafibrate
- ☐ B: ezetimibe
- ☐ C: levothyroxine
- ☐ D: oestrogen replacement therapy
- ☐ E: simvastatin

Correct answer: C

Explanation

This question is testing the candidate's understanding of secondary causes of hypercholesterolaemia. The stem highlights that this patient had a subtotal thyroidectomy which would make thyroid dysfunction probable. Correcting an underactive thyroid is important as it may reduce cholesterol levels but, also, starting cholesterol-lowering medication in patients who are hypothyroid can increase the risk of adverse effects (myalgia).

Question 19

A 27-year-old woman presented with a right-sided thyroid swelling with associated cervical lymphadenopathy.

What is the most likely cause?

Question 19

- ☐ A: anaplastic carcinoma
- ☐ B: follicular adenoma
- ☐ C: follicular carcinoma
- ☐ D: Hashimoto's thyroiditis
- ☐ E: papillary carcinoma

Correct answer: E

Explanation

Malignancy must be considered in any patient with thyroid swelling and associated cervical lymphadenopathy. Papillary thyroid carcinoma is the commonest thyroid malignancy and therefore, in the absence of any further patient history or information in the question, is the correct answer.

Question 20

A 77-year-old man presented with increasing pains around his lower back and lower limb girdle. He had recently presented with symptoms of hesitancy and post-micturition dribbling.

Investigations:

erythrocyte sedimentation rate	28 mm/1st h (<20)
serum corrected calcium	2.34 mmol/L (2.20–2.60)
serum phosphate	0.8 mmol/L (0.8–1.4)
serum alkaline phosphatase	2985 U/L (45–105)
serum prostate-specific antigen	6 µg/L (<4)

What is the most likely cause of this man's pain?

Question 20

- ☐ A: insufficiency fracture of the pelvis
- ☐ B: osteomalacia
- ☐ C: Paget's disease of the pelvis
- ☐ D: polymyalgia rheumatica
- ☐ E: prostatic carcinoma with metastases

Correct answer: C

Explanation

The history of localised bony pain with significantly elevated serum alkaline phosphatase and normal serum corrected calcium and serum phosphate in an elderly man is entirely consistent with a diagnosis of Paget's disease.

The history is not suggestive of insufficiency fracture of the pelvis. In osteomalacia, you would expect to see decreased serum corrected calcium and serum phosphate alongside the raised serum alkaline phosphatase. While he has pain around his pelvic girdle, the erythrocyte sedimentation rate is normal for his age and elevated serum alkaline phosphatase would make polymyalgia rheumatica unlikely. In advanced metastatic prostate cancer, you would expect to see a greater elevation in serum prostate specific antigen and raised serum corrected calcium and phosphate. Lower urinary tract symptoms of hesitancy and post-micturition dribbling are very common in this age group.

Question 21

A 50-year-old man presented with a 2-day history of multiple painful joints. Two weeks previously, he had been started on treatment with allopurinol for tophaceous gout. His only other medication was paracetamol. He had a history of excess alcohol intake.

On examination, his temperature was 37.5°C and there was acute inflammation of the finger joints, wrists, knees and ankles.

Investigations:

serum gamma glutamyl transferase	90 U/L (<50)
serum urate	0.65 mmol/L (0.23–0.46)
serum C-reactive protein	180 mg/L (<10)

What is the most likely cause of his symptoms?

Question 21

- ☐ A: acute pseudogout
- ☐ B: alcoholic binge
- ☐ C: allergic reaction to allopurinol
- ☐ D: allopurinol therapy
- ☐ E: joint sepsis

Correct answer: D

Explanation

The stem gives information that this man has established gout. One could argue that gout treatment should have been started before tophi appeared, but in real life it is not unusual. Joint sepsis is always a differential diagnosis for acute gout. Here, his temperature is not high enough for polyarticular sepsis; serum C-reactive protein gain is also not favouring sepsis. Predisposing factors are very common in polyarticular joint sepsis which again points away from sepsis.

It is a relevant topic and tests candidates' knowledge around urate-lowering therapy initiation.

Question 22

A 17-year-old boy presented with breathlessness and night sweats.

Investigations confirmed a diagnosis of Burkitt's lymphoma.

What is the most likely underlying abnormality of gene expression?

Question 22

- ☐ A: expression of BCR-ABL
- ☐ B: loss of p53
- ☐ C: overexpression of BCL-2
- ☐ D: overexpression of c-myc
- ☐ E: overexpression of JAK2

Correct answer: D

Explanation

Burkitt's lymphoma is an aggressive non-Hodgkin's lymphoma characterised by the overexpression of c-myc, most usually due to a chromosomal translocation between chromosomes 8 and 14, bringing the c-myc gene under the control of the immunoglobulin heavy chain promoter and thus rendering it constitutively active

Question 23

A 37-year-old woman with immune thrombocytopenia failed to respond to corticosteroid therapy. Splenectomy was planned.

What is the optimum time for pneumococcal vaccination?

Question 23

- ☐ A: 1 month after surgery
- ☐ B: 1 month before surgery
- ☐ C: 1 week after surgery
- ☐ D: 1 week before surgery
- ☐ E: perioperatively

Correct answer: B

Explanation

Generally recommended at least 2 weeks before surgery by the British Committee for Standards in Haematology (BCSH).

Question 24

A 30-year-old man had moved recently to the UK. He informed his doctor that he had maturity-onset diabetes of the young (MODY).

What feature, if present, most strongly suggests that this is the correct diagnosis?

Question 24

- ☐ A: a body mass index of 30 kg/m² (18–25)
- ☐ B: a poor response to glipizide therapy
- ☐ C: a strong family history of diabetes mellitus
- ☐ D: recurrent episodes of diabetic ketoacidosis
- ☐ E: X-linked recessive inheritance

Correct answer: C

Explanation

MODY is suspected when diabetes mellitus occurs in a young person with a strong family history of diabetes mellitus.

Question 25

A 17-year-old girl presented with a single, painless, enlarged cervical lymph node. She was asymptomatic.

Investigations:

chest X-ray	enlarged mediastinal lymph nodes
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What is the most likely diagnosis?

Question 25

- ☐ A: angioimmunoblastic T-cell lymphoma
- ☐ B: extramedullary plasmacytoma
- ☐ C: follicular B-cell non-Hodgkin's lymphoma
- ☐ D: Hodgkin's lymphoma
- ☐ E: mantle cell lymphoma

Correct answer: D**Explanation**

The stem makes clear that this adolescent female has cervical and mediastinal lymphadenopathy. She has no other described symptoms and so it should be presumed she is otherwise well. The presence of mediastinal lymphadenopathy should be considered pathological.

The most common single malignant diagnosis in a patient of this age is Hodgkin's lymphoma (D). This condition most commonly presents with neck and mediastinal lymphadenopathy and is a condition with a peak in incidence during adolescence. Patients may be asymptomatic.

Angioimmunoblastic T cell lymphoma (answer A) is a condition uncommon in this age group and would classically present with more widespread lymphadenopathy and a rash.

Extramedullary plasmacytoma (answer B) would be unlikely in this age group and would classically present with lesions in the upper respiratory tract, such as the oropharynx.

Follicular B-cell non-Hodgkin's lymphoma (answer C) would be much less likely than Hodgkin's lymphoma in this age group, although it could present with asymptomatic lymphadenopathy.

Mantle cell lymphoma (answer E) is unlikely in this age group and would be expected to classically present with more widespread lymphadenopathy and splenomegaly.

Question 26

A 70-year-old man presented accompanied by his wife, who stated that her husband had lost all interest in life.

What would support a diagnosis of dementia rather than depressive disorder?

Question 26

- ☐ A: agitation
- ☐ B: complaint of poor memory
- ☐ C: impaired short-term memory
- ☐ D: loss of libido
- ☐ E: urinary incontinence

Correct answer: E

Explanation

A patient making a subjective complaint of poor memory would be commoner in depression. An objective finding of poor short-term memory is commoner in dementia.

Agitation can occur in both.

Loss of libido is common in depression not dementia.

Urinary incontinence very rare in depression and occurs in dementia especially as it advances and if due to normal pressure hydrocephalus

Question 27

A 52-year-old man presented following the sudden onset of severe anterior chest pain. An acute myocardial infarction was suspected and subsequently confirmed by serum troponin concentration and ECG.

Following admission, he was noted to be hypotensive with oliguria. A Swan-Ganz catheter was inserted. The mean right atrial pressure was found to be 20 mmHg (3) and the mean pulmonary arterial wedge pressure was 2 mmHg (9).

What is the most likely explanation for these pressure measurements?

Question 27

- ☐ A: acute left ventricular failure
- ☐ B: acute mitral regurgitation
- ☐ C: hypovolaemia
- ☐ D: pericardial tamponade
- ☐ E: right ventricular failure

Correct answer: E

Explanation

E: Right ventricular failure is the best answer. The Swan-Ganz catheter measures pressures in the right side of the heart and pulmonary arteries, and can also estimate left ventricular filling pressures by measuring indirect left atrial mean pressure. This latter measurement is achieved by “wedging” the distal catheter tip in a small branch of one of the pulmonary arteries (using an inflatable balloon at the tip of the catheter) so that it is isolated from the pulmonary artery pressure. In this case the haemodynamic data show an elevated right atrial pressure, but a reduction in the indirect left atrial mean pressure, due to reduced output from the right ventricle. This is the pattern seen with a large right ventricular infarction, and reflects the classical clinical scenario of hypotension, raised jugular venous pressure, but clear lung fields.

A: Acute left ventricular failure would cause elevation of the indirect left atrial mean pressure.

B: Acute mitral regurgitation would also cause elevation of the indirect left atrial mean pressure, with a prominent “V wave” due to regurgitation of blood into the left atrium.

C: Hypovolaemia would result in both the right atrial pressure and the indirect left atrial mean pressure being low.

D: Pericardial tamponade would lead to elevation and equalisation of the right atrial pressure and the indirect left atrial mean pressure.

Question 28

A 32-year-old woman returned from a holiday in the Mediterranean with a suntan and numerous hypopigmented, slightly scaly lesions on the neck and upper trunk. She mentioned that the same areas had been fawn-coloured in the months before her holiday and that these areas of skin had failed to tan during her time in the Mediterranean.

What is the most likely diagnosis?

Question 28

- ☐ A: chronic plaque psoriasis
- ☐ B: discoid eczema
- ☐ C: pityriasis rosea
- ☐ D: pityriasis versicolor
- ☐ E: seborrhoeic dermatitis

Correct answer: D

Explanation

The correct answer is pityriasis versicolor, which typically affects the neck and upper trunk, causing beige- or fawn-coloured areas on untanned skin but these areas become hypopigmented when the rest of the patient's skin becomes tanned following repeated sun exposure. Sun exposure can improve some other skin diseases such as psoriasis and eczema, and this may result in hypopigmented areas at the site of the previous lesions in some cases, but one would expect a history of lesions at other sites, for example on the upper and lower limbs, as well as on the trunk. Seborrhoeic dermatitis is a common cause of dandruff and consists of an erythematous scaly macular rash affecting the scalp, eyebrows, nasolabial folds and, less frequently, the centre of the chest (presternal region), axillae and perianal area. Pityriasis rosea affects the trunk and limbs, and starts with a "herald patch" (a single patch) followed 1–2 weeks later by more generalised erythematous scaly patches on the trunk and upper limbs which slowly spreads downwards to the thighs and subsequently fades over the next 6–8 weeks.

Question 29

A 65-year-old woman presented with generalised arthralgia for the previous 2 weeks. She had a past medical history of urinary tract infections. She was advised to take an NSAID.

On examination, her blood pressure was 139/98 mmHg and she had pitting oedema below the knees.

Investigations:

serum creatinine	458 $\mu\text{mol/L}$
24-h urinary total protein	1.3 g (<0.15 g)

What is the most likely cause of the renal impairment?

Question 29

- ☐ A: acute tubular necrosis
- ☐ B: IgA nephropathy
- ☐ C: membranous glomerulonephropathy
- ☐ D: papillary necrosis
- ☐ E: tubulointerstitial nephritis

Correct answer: E

Explanation

She has acute kidney injury but marginally increased proteinuria. NSAIDs typically cause an interstitial nephritis and small amount of proteinuria (which is not enough for membranous). There is no reason for Options A, B or D.

Question 30

A 47-year-old man presented with a 6-month history of episodic sweating and hunger. He had gained 10 kg in weight and drank 10 units of alcohol per week.

Investigations:

full blood count	normal
fasting plasma glucose	4.0 mmol/L (3.0–6.0)
liver function tests	normal

What is the most appropriate next investigation?

Question 30

- ☐ A: CT scan of pancreas
- ☐ B: EEG
- ☐ C: home blood glucose monitoring
- ☐ D: plasma glucose concentration following a prolonged (72-h) fast
- ☐ E: serum C-peptide concentration

Correct answer: D

Explanation

Recurrent sweating and hunger in the presence of weight gain and a borderline low fasting glucose profile prompts the consideration for insulinoma. Measuring prolonged (72 h) fasting glucose levels is the gold standard initial test for insulinoma.

CT scan is not an initial investigation without proving true hypoglycaemia and may miss an insulinoma. There is not enough to suggest the patient needs investigation for epilepsy. Home glucose monitoring will not aid the diagnosis. Serum C-peptide is not beneficial in the absence of true hypoglycaemia

Question 31

A 25-year-old woman presented complaining of loose stools five to six times per day. One year previously, she had undergone resection of her terminal ileum for Crohn's disease. Her only drug therapy was mesalazine.

On examination, there was no abdominal tenderness.

Investigations:

haemoglobin	126 g/L (115–165)
serum albumin	38 g/L (37–49)
serum C-reactive protein	4 mg/L (<10)

What is the most likely diagnosis?

Question 31

- ☐ A: active Crohn's disease
- ☐ B: adverse effect of mesalazine
- ☐ C: bile salt-induced diarrhoea
- ☐ D: enteric infection
- ☐ E: irritable bowel syndrome

Correct answer: C

Explanation

Bile salt-induced diarrhoea (or malabsorption) is a common and recognised consequence of terminal ileal resection as bile salts are reabsorbed in the terminal ileum. Loss of the terminal ileum leads to excess bile salts in the colon which can act as an irritant, causing diarrhoea. Active Crohn's disease is less likely as the serum C-reactive protein and haemoglobin are normal. Adverse effects of mesalazine tend to occur soon after initial prescription. Enteric infection is less likely due to the chronicity of symptoms. Whilst irritable bowel syndrome is a possibility and is recognised to occur in inflammatory bowel disease, bile salt remains more likely in the context of a terminal ileal resection and needs to be excluded first.

Question 32

A 71-year-old woman required a transfusion of 2 units of blood after a hip replacement. One week later, her haemoglobin concentration had fallen by 42 g/L.

What associated finding is most likely to indicate a delayed transfusion reaction?

Question 32

- ☐ A: conjugated hyperbilirubinaemia
- ☐ B: elevated D-dimer
- ☐ C: haemoglobinuria
- ☐ D: haemosiderinuria
- ☐ E: positive direct antiglobulin test

Correct answer: E

Explanation

A delayed haemolytic transfusion, by definition, occurs more than 24 hours after transfusion but is usually clinically evident approximately 2 weeks after transfusion. It is caused by boosting of a previously generated alloantibody and causes a positive direct antiglobulin test, a raised bilirubin with clinical jaundice, anaemia, reticulocytosis and a raised lactate dehydrogenase. The blood transfusion antibody screen is positive and spherocytosis is seen on examination of the blood film. An unexplained fever typically occurs.

Question 33

A 30-year-old woman presented with a 4-hour history of palpitations. She had no significant medical history.

Investigations:

ECG	atrial fibrillation with a ventricular rate of 130 beats/min
-----	--

What drug is most likely to restore sinus rhythm?

Question 33

- ☐ A: adenosine
- ☐ B: bisoprolol
- ☐ C: esmolol
- ☐ D: flecainide
- ☐ E: verapamil

Correct answer: D

Explanation

D: Flecainide is the best answer. Of the drugs listed, it is the one most likely to restore sinus rhythm in a young patient with acute-onset atrial fibrillation. It is particularly indicated in patients who have accessory pathways. Care has to be taken however to avoid using the drug in patients with left ventricular dysfunction or ischaemic heart disease as it is negatively inotropic.

A: There is no role for adenosine in the treatment or diagnosis of atrial fibrillation. B: bisoprolol, C: esmolol, and E: verapamil might all restore sinus rhythm, but are less efficacious for this indication than flecainide.

Question 34

A 20-year-old woman presented with a 2-month history of an intensely pruritic rash on her trunk and limbs. She was otherwise well.

On examination, she had multiple, violaceous, flat-topped papules over the flexor surfaces of the wrists, and on the ankles and lower back. The papules were aggregated in a linear fashion at one site on her left forearm.

What clinical feature is most likely to be present?

Question 34

- ☐ A: asymmetric oligoarthritis
- ☐ B: burrows in finger webs
- ☐ C: conjunctival scarring
- ☐ D: involvement of the buccal mucosa
- ☐ E: non-scarring alopecia

Correct answer: D

Explanation

Lichen planus causes violaceous, flat-topped papules, which are often seen on the flexor surfaces of the wrists, lower back and ankles as well as elsewhere on the skin. Lichen planus can koebnerise, which is when the lesions arise at an area of skin which has been traumatised, and the linear pattern on left forearm would be consistent with koebnerisation from scratching. Lichen planus frequently causes a lacy white pattern on the buccal mucosa, hence D is the answer.

When lichen planus affects the scalp (i.e. lichen planopilaris) it causes a scarring alopecia, so E is unlikely.

Conjunctival scarring with lichen planus has been reported but this is uncommon, so C is incorrect.

Burrows in finger webs are seen in scabies, not lichen planus, so B is incorrect.

Lichen planus does not affect the joints, so A is incorrect.

Question 35

A 60-year-old woman with rheumatoid arthritis presented with an acutely inflamed right knee. The joint was aspirated and methylprednisolone 80 mg was injected after the removal of 20 mL of non-purulent synovial fluid. The knee improved following this procedure but her symptoms recurred and became much worse a week later.

Investigations:

haemoglobin	105 g/L (115–165)
white cell count	$15.5 \times 10^9/\text{L}$ (4.0–11.0)
neutrophil count	$13.5 \times 10^9/\text{L}$ (1.5–7.0)
erythrocyte sedimentation rate	55 mm/1st h (<30)

What is the most appropriate next investigation?

Question 35

- ☐ A: blood cultures
- ☐ B: serum C-reactive protein
- ☐ C: serum urate
- ☐ D: synovial fluid culture
- ☐ E: X-ray of right knee

Correct answer: A**Explanation**

The scenario in question is typical for septic arthritis following joint injection, which is a known complication of the procedure with an estimated prevalence of four cases per 10 000 injections. The most appropriate next step is to send a blood culture sample. This can be obtained at the same time when sample taken for routine blood tests. Obtaining a blood culture before administering antibiotics increases chances of microbial growth and will help to decide the appropriate antibiotic selection.

Synovial fluid analysis may be useful to identify bacteria by Gram stain but culture may not be always successful. Synovial fluid aspiration is not a common skill and there may be delays in obtaining a sample. Synovial fluid aspiration should not delay the antibiotic administration in this scenario.

Serum C-reactive protein is a non-specific marker of inflammation and could be raised in a flare of rheumatoid arthritis, or for numerous other reasons.

Crystal arthropathy is a well-recognised cause of monoarthritis but the clinical history makes this less likely and the urate level can be normal in up to 25% of patients during an acute attack so would not exclude the diagnosis.

Finally, an X-ray of knee will most likely be normal in the acute phase of septic arthritis or may show old changes, but cannot be used to confirm the cause of the swollen joint.

Question 36

A 75-year-old man presented with weight loss, lethargy and repeated haemoptysis. He had been treated for pulmonary tuberculosis 10 years previously.

Investigations:

Aspergillus fumigatus IgE	positive
Aspergillus fumigatus specific IgG	positive
chest X-ray	a solid lesion at the left lung

What is the most likely diagnosis?

Question 36

- ☐ A: allergic bronchopulmonary aspergillosis
- ☐ B: aspergilloma
- ☐ C: bronchial carcinoma
- ☐ D: invasive aspergillosis
- ☐ E: reactivation of tuberculosis

Correct answer: B

Explanation

The differential diagnosis for this presentation includes all of the conditions listed. The positive *Aspergillus fumigatus* IgE, *Aspergillus fumigatus* specific IgG and a solid lesion on chest X-ray strongly suggest an aspergilloma. Invasive aspergillosis will not present with a solid mass and only occurs in someone who is immunosuppressed. Patients with allergic bronchopulmonary aspergillosis have proximal bronchiectasis and present with productive cough and wheeze but not haemoptysis.

Question 37

A 24-year-old man presented with agitation and central chest pain. He had been taking cocaine earlier that day.

On examination, he had a pulse of 100 beats per minute and a blood pressure of 170/110 mmHg.

What complication is most likely?

Question 37

- ☐ A: hypercalcaemia
- ☐ B: hyperkalaemia
- ☐ C: hyperthermia
- ☐ D: hyponatraemia
- ☐ E: hypothermia

Correct answer: C

Explanation

Cocaine is a sympathomimetic drug which causes chest pain, hypertension, agitation and arrhythmias.

Hyperthermia and rhabdomyolysis are recognised complications resulting from its serotonergic effects.

Question 38

A 51-year-old woman presented with a 2-year history of intermittent episodes of arthralgia, rash and fevers. She complained of increasing fatigue, breathlessness and swollen ankles over the previous 6 months.

On examination, she had a purpuric rash on the lower extremities and a right-sided pleural effusion. Urinalysis showed protein 3+, blood 1+.

Investigations:

erythrocyte sedimentation rate	140 mm/1st h (<30)
serum creatinine	140 µmol/L (60–110)
serum complement C4	<5 mg/dL (15–50)
antinuclear antibodies	1:600 dilution (negative at 1:20)
rheumatoid factor	90 kIU/L (<30)

What is the most likely diagnosis?

Question 38

- ☐ A: IgA vasculitis (Henoch–Schönlein purpura)
- ☐ B: microscopic polyangiitis
- ☐ C: mixed cryoglobulinaemia

- ☐ D: rheumatoid arthritis
- ☐ E: systemic lupus erythematosus

Correct answer: E

Explanation

The stem has a description of multisystem involvement. Investigations show a multisystem inflammatory complement-consuming illness. Systemic lupus erythematosus is the most likely cause for this clinical presentation; it has affected musculoskeletal, renal and skin and has systemic manifestation. IgA vasculitis (Henoch–Schönlein purpura) is not common in this age group. Microscopic polyangiitis would affect the respiratory system also. Mixed cryoglobulinaemia is rare and there are no predisposing illnesses here. Rheumatoid arthritis (RA) is not a complement-consuming condition and would not cause renal involvement at such an early stage; the RA test is not a diagnostic test or a specific test for RA.

Question 39

A 64-year-old man presented with increasing pain in his right elbow and tingling in the medial aspect of his right hand. His job involved using a sledgehammer.

On examination, he had a restricted range of movement of his right elbow.

What is the most likely diagnosis?

Question 39

- ☐ A: C6 radiculopathy
- ☐ B: compartment syndrome of the forearm
- ☐ C: lateral epicondylitis
- ☐ D: median nerve entrapment
- ☐ E: ulnar nerve entrapment

Correct answer: E

Explanation

The distribution of the tingling would suggest an ulnar nerve problem. The ulnar nerve is commonly affected by compression at the elbow (medial epicondyle) and can be exacerbated by repetitive or prolonged use of the elbow.

Question 40

A 75-year-old woman presented with a 6-month history of an ulcer over the right ankle. She had a history of right deep venous thrombosis 5 years previously.

On examination, she had a superficial sloughing ulcer, 6 cm in diameter, over the medial malleolus.

What is the most appropriate investigation?

Question 40

- ☐ A: ankle-brachial pressure index
- ☐ B: bacteriological swab of the ulcer
- ☐ C: bilateral lower limb arteriography
- ☐ D: right leg venography
- ☐ E: venous duplex ultrasound scan

Correct answer: A

Explanation

This is a case of venous ulceration, and the information which indicates this is:

- (i) the fact that the patient previously had a deep venous thrombosis of the same leg some years previously, which damaged the valves in the veins,
- (ii) the site of the ulcer, over the ankle/medial malleolus, and
- (iii) the superficial nature of the ulcer.

Treatment for venous ulceration is with a compression bandage, which allows the leg muscles to pump the blood back to the heart when the patient walks because contracting the calf muscles presses against the compression bandage and squeezes the blood up along the vein. However, compression is contraindicated if there is insufficient arterial supply to the foot, because in that case the compression could lead to lower limb ischaemia, so it is important to always check blood flow into the leg before prescribing compression bandages. While one can feel for a pulse (dorsalis pedis or posterior tibialis), this is not as accurate as doing an ankle-brachial pressure index, thus A is the correct answer.

Question 41

A 65-year-old woman with a 40-year history of rheumatoid arthritis presented with a 4-month history of lower leg oedema. She was taking methotrexate weekly and prednisolone daily.

Urinalysis showed protein 3+.

Investigations:

haemoglobin	94 g/L (115–165)
white cell count	$10.6 \times 10^9/\text{L}$ (4.0–11.0)
erythrocyte sedimentation rate	105 mm/1st h (<30)
serum albumin	24 g/L (37–49)

What further investigation is most likely to be of diagnostic value?

Question 41

- ☐ A: lower leg venography
- ☐ B: rectal biopsy
- ☐ C: renal angiography
- ☐ D: serum protein electrophoresis
- ☐ E: ultrasound scan of kidneys

Correct answer: B

Explanation

This is a case of AA amyloidosis, secondary to chronic inflammation due to rheumatoid arthritis. Most patients with renal amyloidosis will have a degree of proteinuria (which consists mostly of albumin) and can develop nephrotic syndrome; this woman has dependent oedema due to her hypoalbuminaemia.

The investigation of choice for amyloidosis is rectal biopsy as it is relatively non-invasive, compared to renal biopsy, for example. Rectal biopsy has a higher sensitivity with Congo red staining in the diagnosis of amyloidosis than the alternative abdominal fat pad biopsy.

The history and investigation findings are not suggestive of deep venous thrombosis therefore venography would not be indicated, and is no longer the standard investigation.

Renal angiography is used to study the vascular supply to kidneys where aneurysm, renal artery stenosis, etc. are suspected, which again would not fit the clinical scenario.

AL amyloidosis is associated with myeloma, when the abnormal plasma cells produce dysfunctional proteins. There is nothing in the clinical stem to point towards myeloma as a diagnosis, and a monoclonal band on serum electrophoresis would only indicate the possibility of myeloma and would not confirm the presence of the underlying amyloidosis.

Renal ultrasound appearances are non-specific therefore may be suggestive of amyloidosis but could not confirm the diagnosis alone.

Question 42

A 55-year-old man presented with a 12-month history of increasing breathlessness.

On examination, he had finger clubbing, and widespread end-inspiratory fine crackles on chest auscultation.

Investigations:

chest X-ray

diffuse lung shadowing

What pulmonary function test result would be most characteristic of a diagnosis of idiopathic pulmonary fibrosis?

Question 42

- ☐ A: forced expiratory volume in 1 s/forced vital capacity ratio 60%
- ☐ B: peak flow 50% of predicted value
- ☐ C: residual volume 110% of predicted value
- ☐ D: total lung capacity 95% of predicted value
- ☐ E: transfer factor for CO (TL_{co}) 50% of predicted value

Correct answer: E

Explanation

This patient has pulmonary fibrosis, probably usual interstitial pneumonitis (UIP). The clinical presentation is typical. The most important and useful measurement is the diffusing capacity/transfer factor which is a measure of how effectively oxygen diffuses from the alveolus into the bloodstream. TLCO is used to determine the severity of the fibrosis and can be used to monitor progression of disease. The other values are less useful.

Question 43

A 42-year-old man was found to have abnormal liver function tests. He had had ulcerative colitis for 15 years. He had been treated initially with mesalazine but this had been stopped 8 years previously when his disease had gone into remission.

Investigations:

serum albumin	40 g/l
serum total bilirubin	15 µmol/l
serum alanine aminotransferase	63 U/l
serum aspartate aminotransferase	41 U/l
serum alkaline phosphatase	741 U/l
serum gamma glutamyl transferase	221 U/l

What is the most likely cause of these blood results?

Question 43

- ☐ A: autoimmune hepatitis
- ☐ B: fatty liver
- ☐ C: liver metastases
- ☐ D: primary biliary cirrhosis
- ☐ E: primary sclerosing cholangitis

Correct answer: E

Explanation

The pattern of derangement of liver function tests is suggestive of a cholestatic disorder such as primary sclerosing cholangitis, which is recognised to occur in up to 10% of ulcerative colitis patients. Primary biliary cirrhosis is not directly linked with ulcerative colitis; autoimmune hepatitis is a possibility but the pattern of liver function tests is less suggestive and there is limited association with ulcerative colitis. Fatty liver is possible but the pattern of liver function tests makes it less likely. Metastases are also possible but there is nothing to suggest it in the history and is less likely than primary sclerosing cholangitis in a 42-year-old man

Question 44

A 65-year-old man presented with gradually worsening exertional angina, and underwent percutaneous coronary intervention with a drug-eluting stent. He was advised to take clopidogrel in addition to aspirin, atenolol and simvastatin.

What is the predominant mechanism through which clopidogrel inhibits platelet aggregation?

Question 44

- ☐ A: enhances the effect of circulating antithrombin
- ☐ B: inhibits binding of adenosine diphosphate
- ☐ C: inhibits cyclo-oxygenase-1
- ☐ D: irreversibly binds glycoprotein IIb/IIIa receptor sites
- ☐ E: prevents production of thromboxane A₂

Correct answer: B

Explanation

B is the best answer. Clopidogrel irreversibly inhibits platelet aggregation via P2Y₁₂ class ADP receptors.

A: Heparin enhances the activity of circulating antithrombin.

C: Aspirin is a weakly selective COX-1 inhibitor.

D: Several drugs bind glycoprotein IIb/IIIa receptor sites on platelets, thereby preventing aggregation. Abciximab has high affinity.

E: Aspirin inhibits production of thromboxane A₂, through COX-1 inhibition.

Question 45

A 45-year-old man presented with recurrent epistaxis.

On examination, there was telangiectasia on his lips and in his mouth. A diagnosis of hereditary haemorrhagic telangiectasia was made.

What is the most likely mode of inheritance?

Question 45

- ☐ A: autosomal dominant
- ☐ B: autosomal recessive
- ☐ C: mitochondrial inheritance
- ☐ D: sporadic mutation
- ☐ E: X-linked recessive

Correct answer: A

Explanation

This condition is also known as Osler–Weber–Rendu syndrome/disease and is inherited in an autosomal dominant fashion

Question 46

A 50-year-old man presented with a 24-hour history of agitation, confusion and suicidal thoughts. He had started VAD chemotherapy (vincristine, doxorubicin and dexamethasone) 4 days previously, following a diagnosis of multiple myeloma.

What is the most likely cause of his symptoms?

Question 46

- ☐ A: adjustment disorder
- ☐ B: confusion secondary to sepsis
- ☐ C: corticosteroid psychosis
- ☐ D: reactive depression
- ☐ E: vincristine encephalopathy

Correct answer: C

Explanation

Abrupt onset after chemotherapy and the finding of confusion would be unusual for adjustment disorder and depression. Vincristine causes encephalopathy if given intrathecally by mistake. Sepsis is a possibility but there is nothing else to suggest this in the stem. The finding of agitation and use of dexamethasone indicate that C is most likely and it is relatively common clinically.

Question 47

A 78-year-old man presented after several falls. He had a 20-year history of rheumatoid arthritis and his only medication was sulfasalazine.

On examination, he had been incontinent of urine and had difficulty in recalling recent events. He had chronic rheumatoid hand deformities, a right-sided grasp reflex and bilateral extensor plantar responses. He had difficulty in rising from a chair, walked with small paces and was unsteady on turning, having to hold on to his wife.

What is the most likely diagnosis?

Question 47

- ☐ A: Alzheimer's disease
- ☐ B: cervical myelopathy
- ☐ C: multi-infarct dementia
- ☐ D: normal pressure hydrocephalus
- ☐ E: Parkinson's disease

Correct answer: D

Explanation

Normal pressure hydrocephalus (NPH) is characterised by the triad of progressive cognitive impairment and dementia, problems with walking, and impaired bladder control. Usually, there is general slowing of movements and patients complain that their feet feel "stuck" leading to difficulties turning and walking with small paces. Of the possible answers, NPH is the most likely given the description, although the diagnosis can often be challenging in clinical practice.

Question 48

A 21-year-old man presented after he had injured his back, resulting in hemisection of his spinal cord at T10 level.

What is most likely to be present below the level of the lesion 2 months after the injury?

Question 48

- ☐ A: contralateral gross wasting
- ☐ B: contralateral loss of pain and temperature sensation
- ☐ C: contralateral loss of proprioception
- ☐ D: contralateral upper motor neurone weakness
- ☐ E: ipsilateral gross wasting

Correct answer: B

Explanation

Answering this question requires understanding of spinal cord anatomy. Since pain and temperature fibres (spinothalamic) cross at or just above the level they enter the spinal cord, hemisection of the cord causes contralateral loss of pain and temperature sensation. This is a feature of the Brown-Séquard syndrome.

Question 49

A healthy 19-year-old medical student was asked to perform a Valsalva manoeuvre (forced expiration against a closed glottis) for demonstration purposes in a physiology class.

What is the most likely initial haemodynamic response?

Question 49

- ☐ A: decreased jugular venous pressure
- ☐ B: decreased pulse
- ☐ C: decreased systolic blood pressure
- ☐ D: decreased venous return to the heart
- ☐ E: increased cardiac output

Correct answer: D

Explanation

Increased intrathoracic pressure shifts blood from the pulmonary circulation to the left atrium, and also causes reduced systemic return to the right side of the heart. Jugular venous pressure will increase initially and cardiac output drops.

Question 50

A 47-year-old woman was being treated with lithium for bipolar affective disorder.

On examination, her blood pressure was 168/104 mmHg.

What is the most appropriate antihypertensive drug for her?

Question 50

- ☐ A: amlodipine
- ☐ B: bendroflumethiazide
- ☐ C: doxazosin
- ☐ D: losartan
- ☐ E: ramipril

Correct answer: A

Explanation

Although NICE guidelines recommend an ACE inhibitor as first line in patients <55 years old, amlodipine is the preferred choice as it does not cause a significant increase in serum lithium concentration. ACE inhibitors, angiotensin II receptor antagonists and thiazide diuretics can all cause lithium toxicity by reducing renal lithium clearance

Question 51

A 43-year-old woman presented with a 1-week history of polyuria and nocturia without weight loss.

Clinical examination was normal.

Investigations:

serum sodium	142 mmol/L (137–144)
serum potassium	3.5 mmol/L (3.5–4.9)
serum corrected calcium	2.60 mmol/L (2.20–2.60)
random plasma glucose	7.0 mmol/L
serum osmolality	310 mosmol/kg (278–300)
urinary osmolality	200 mosmol/kg (100–1000)

What is the most likely diagnosis?

Question 51

- ☐ A: compulsive polydipsia
- ☐ B: diabetes insipidus
- ☐ C: diabetes mellitus
- ☐ D: hyperparathyroidism
- ☐ E: syndrome of inappropriate antidiuretic hormone

Correct answer: B

Explanation

Raised serum osmolality with urinary osmolality on the lower side in the setting of this patient's symptoms indicates diabetes insipidus. There is not enough in the question to suggest compulsive polydipsia; the random plasma glucose level is not consistent with diabetes mellitus; calcium is not elevated; and syndrome of inappropriate antidiuretic hormone (SIADH) results in a low serum osmolality.

Question 52

A 24-year-old woman presented with diarrhoea of 8 weeks' duration. In the past week, she had noticed blood in the stool, and was passing 10 to 12 stools per day and waking at night with the urge to defaecate.

On examination, she had a temperature of 38.0°C. The abdomen was generally tender, without guarding or rigidity.

What is the most appropriate next investigation?

Question 52

- ☐ A: colonoscopy
- ☐ B: CT scan of abdomen
- ☐ C: plain X-ray of abdomen
- ☐ D: rigid sigmoidoscopy
- ☐ E: stool microscopy

Correct answer: C

Explanation

It is critical to exclude toxic colon dilatation, as the likely diagnosis is acute severe ulcerative colitis. Whilst colonoscopy and rigid sigmoidoscopy will help make the diagnosis they cannot exclude toxic dilatation, which is a potential surgical emergency. Stool microscopy is unlikely to be helpful as the symptoms are chronic and, although indicated, the results will take a few days to be available. A CT scan is not indicated before a plain film in acute ulcerative colitis.

Question 53

In a large prospective trial of a statin in patients with angina, 1000 patients were treated with a statin and 1000 with a placebo. A total of 150 patients taking the placebo experienced a cardiovascular event, compared with 100 taking the active drug.

	placebo
cardiovascular event	150
no cardiovascular event	850

What is the number-needed-to-treat (NNT) to prevent one cardiovascular event?

Question 53

- ☐ A: 2.5 (250/100)
- ☐ B: 5 (250/50)
- ☐ C: 10 (1000/100)
- ☐ D: 20 (1000/50)
- ☐ E: 40 (2000/50)

Correct answer: D

Explanation

50 extra events occurred in the placebo arm of 1000 people, so 1000 must be treated to prevent 50 events, therefore 20 people are treated for every 1 event prevented, or $NNT=20$.

Question 54

A 37-year-old woman with a history of depression was brought to hospital having been found in a state of collapse. She had written a suicide note, and had an empty bottle of amitriptyline in her jacket.

On examination, her pulse was 135 beats per minute and her blood pressure was 105/50 mmHg.

Investigations:

serum potassium	4.5 mmol/L (3.5–4.9)
serum bicarbonate	18 mmol/L (20–28)
serum urea	8.5 mmol/L (2.5–7.0)
serum creatinine	110 µmol/L (60–110)
ECG	sinus tachycardia; QRS duration 135 ms; bursts of non-sustained ventricular tachycardia

What is the most appropriate initial intravenous treatment?

Question 54

- ☐ A: amiodarone
- ☐ B: esmolol
- ☐ C: magnesium

- ☐ D: sodium bicarbonate
- ☐ E: sodium chloride 0.9%

Correct answer: D

Explanation

Treatment of complications of tricyclic poisoning (hypotension and arrhythmias) consists of correction of metabolic acidosis with sodium bicarbonate. Serum alkalinisation reduces binding of tricyclic antidepressants to the myocardium.

Question 55

A 20-year-old man was found collapsed.

On examination, he had a Glasgow coma score of 6. His pulse was 60 beats per minute, his blood pressure was 90/60 mmHg and his respiratory rate was 8 breaths per minute. His muscle tone was reduced, his pupils were small but reacting and his plantar responses were downgoing.

What is the most likely cause of this presentation?

Question 55

- ☐ A: diazepam
- ☐ B: dihydrocodeine
- ☐ C: diphenhydramine
- ☐ D: MDMA ('ecstasy')
- ☐ E: methanol

Correct answer: B

Explanation

The combination of reduced conscious level, reduced respiratory rate and small pupils (miosis) is a classic triad for the opioid toxidrome.

Question 56

On removal of the renal arterial clamp following a donor kidney transplantation, the surgeon noted changes suggestive of hyperacute rejection.

Which immunoglobulin is most likely to be responsible?

Question 56

- ☐ A: IgA
- ☐ B: IgD
- ☐ C: IgE
- ☐ D: IgG
- ☐ E: IgM

Correct answer: D

Explanation

Hyperacute rejection occurs due to pre-existing humoral immunity, which is IgG mediated.

Question 57

A 25-year-old woman presented with increasingly severe headache and two generalised seizures, 36 hours after the normal vaginal delivery of her first baby at 40 weeks' gestation. She had been treated with epidural analgesia during labour.

On examination, her temperature was 37.6°C, she was drowsy, there was a mild left hemiparesis and both plantar responses were extensor.

What is the most likely diagnosis?

Question 57

- ☐ A: bacterial meningitis
- ☐ B: pre-eclamptic toxemia
- ☐ C: subarachnoid haemorrhage
- ☐ D: venous sinus thrombosis
- ☐ E: viral encephalitis

Correct answer: D

Explanation

The combination of headache, increasing drowsiness (suggesting rising intracranial pressure), focal neurological signs and seizures in a woman shortly post partum is highly suggestive of a venous sinus thrombosis.

Question 58

The half-life of a novel anti-obesity drug exhibiting first-order kinetics was calculated to be 4 hours.

What percentage of the drug will be eliminated 20 hours after ingestion?

Question 58

- ☐ A: 75%
- ☐ B: 80%
- ☐ C: 90%
- ☐ D: 97%
- ☐ E: 100%

Correct answer: D

Explanation

After five half-lives, 97% of a drug is eliminated
(50%+25%+12.5%+6.25%+3.125%)

Question 59

A 16-year-old boy with type 1 diabetes mellitus was treated with a biphasic insulin preparation but achievement of good blood glucose control proved difficult. He was offered treatment with the insulin analogue, insulin lispro.

Which characteristic of insulin lispro might improve his glycaemic control?

Question 59

- ☐ A: low incidence of hypoglycaemia
- ☐ B: low incidence of lipoatrophy at the injection site
- ☐ C: low risk of immunogenic reaction
- ☐ D: rapid onset of action
- ☐ E: small injection volume

Correct answer: D

Explanation

Insulin lispro is a rapid-acting human insulin analogue and leads to lower post-prandial glucose concentrations compared to biphasic insulin.

Question 60

A 74-year-old woman presented with distressing restlessness in her legs, particularly at night. She usually had to get out of bed several times to reduce her symptoms, and her sleep was being disturbed.

What is the most appropriate treatment?

Question 60

- ☐ A: clonazepam
- ☐ B: co-beneldopa
- ☐ C: propranolol
- ☐ D: quinine
- ☐ E: ropinirole

Correct answer: E

Explanation

The dopamine agonists ropinirole, pramipexole and rotigotine may be used for the treatment of restless legs syndrome.

Question 61

A 32-year-old man was treated with combination chemotherapy for testicular cancer. Subsequent investigations confirmed a complete clinical remission.

What is the dominant cellular process that explains why this therapy was successful?

Question 61

- ☐ A: apoptosis
- ☐ B: differentiation
- ☐ C: mutagenesis
- ☐ D: necrosis
- ☐ E: senescence

Correct answer: A

Explanation

Apoptosis, programmed cell death, is the only mechanism which would precipitate cure without unacceptable adverse effect

Question 62

In a large multicentre clinical trial to assess the effectiveness of a new antihypertensive drug, subjects were randomised to be treated with either the new drug or an existing standard antihypertensive one. The main outcome criterion was the blood pressure after 2 months of treatment.

What is the most appropriate statistical technique to compare mean blood pressure between the groups?

Question 62

- ☐ A: chi-squared test
- ☐ B: Mann–Whitney U test
- ☐ C: Pearson's correlation coefficient
- ☐ D: regression analysis
- ☐ E: two-sample t-test

Correct answer: E

Explanation

The study is classed as "large" so a parametric test is acceptable, and both groups are likely to have the same variance.

The two-sample t-test will compare the two sets of data better than Mann-Whitney U test.

Regression and correlation tests are not relevant. The chi-squared test is used for expected versus observed results.

Question 63

A 71-year-old woman presented with a 2-hour history of severe pain and loss of vision in her right eye. She had noticed halos around lights during the previous 24 hours.

On examination, there was ciliary vessel hyperaemia and a dilated unreactive pupil on the affected side.

What is the most likely diagnosis?

Question 63

- ☐ A: anterior uveitis
- ☐ B: closed-angle glaucoma
- ☐ C: diffuse scleritis
- ☐ D: orbital cellulitis
- ☐ E: retinal artery occlusion

Correct answer: B

Explanation

Acute closed-angle glaucoma is caused by a rapid or sudden increase in intraocular pressure. It may occur by rapid dilatation of the pupil causing failure of fluid drainage through the anterior chamber of the eye. Symptoms may include headaches, eye pain, nausea, halos and very blurred vision. Ciliary vessel hyperaemia is an early sign.

Question 64

A 16-year-old boy presented within half an hour of falling. His parents reported that he had fallen and hit the right side of his head on the ground. He had lost consciousness for a few seconds and then made a full recovery.

On examination, he was fully cooperative and had no focal neurological signs. Two hours later, his conscious level deteriorated.

What is the most likely diagnosis?

Question 64

- ☐ A: cerebral oedema
- ☐ B: diffuse axonal injury
- ☐ C: extradural haematoma
- ☐ D: subarachnoid haemorrhage
- ☐ E: subdural haematoma

Correct answer: C

Explanation

The mechanism of injury and the description of the 'lucid period' would be highly suggestive of an extradural haematoma. Diagnosis by prompt brain imaging and urgent referral to a neurosurgery centre should be made.

Question 65

A 55-year-old woman presented with a 2-day history of diplopia and progressive unsteadiness while walking.

On examination, she had limited eye movement in all directions although her pupils were normal. Muscle power in the limbs was normal but tendon reflexes were absent. There was prominent bilateral finger–nose ataxia. Plantar responses were flexor. Sensation was normal.

What is the most likely diagnosis?

Question 65

- ☐ A: brainstem stroke
- ☐ B: Miller Fisher syndrome
- ☐ C: multiple sclerosis
- ☐ D: myasthenia gravis
- ☐ E: Wernicke's encephalopathy
- ☐

Correct answer: B

Explanation

Miller Fisher syndrome is the triad of ataxia, ophthalmoplegia and areflexia. It is rare but well recognised. Of the options given, the only one that would give the combination of signs documented is Miller Fisher syndrome.

Question 66

A 58-year-old man with congestive heart failure remained oedematous despite treatment with furosemide 120 mg daily.

Investigations:

serum sodium	134 mmol/L (137–144)
serum potassium	3.4 mmol/L (3.5–4.9)
serum urea	10.6 mmol/L (2.5–7.0)
serum creatinine	156 µmol/L (60–110)

What is most likely to be present?

Question 66

- ☐ A: high plasma aldosterone concentration
- ☐ B: high serum cortisol concentration
- ☐ C: low plasma angiotensin II concentration
- ☐ D: low plasma atrial natriuretic peptide concentration
- ☐ E: low plasma renin concentration

Correct answer: A

Explanation

This is the physiological change with heart failure as a result of activation of the RAAS. Cortisol should not be significantly affected and options C,D,E are wrong

Question 67

A 34-year-old woman with a 6-year history of Sjögren's syndrome found that she was 14 weeks pregnant.

What autoantibody in this condition is associated with an increased risk of congenital heart block in the fetus?

Question 67

- ☐ A: anticardiolipin
- ☐ B: anticomere
- ☐ C: anti-La
- ☐ D: anti-neutrophil cytoplasmic (ANCA)
- ☐ E: anti-Ro

Correct answer: E

Explanation

This question tests the knowledge of transplacental transfer of antibodies and consequences on the fetus. Both anti-Ro and anti-La antibodies can be involved, but it is more common with anti-Ro antibodies.

Question 68

A 72-year-old man presented with a 2-day history of pain and swelling of the right knee. Analysis of synovial fluid from the right knee confirmed the presence of calcium pyrophosphate crystals.

What is the microscopic appearance of these crystals?

Question 68

- ☐ A: needle-shaped with negative birefringence
- ☐ B: needle-shaped with no birefringence
- ☐ C: needle-shaped with positive birefringence
- ☐ D: rhomboid with negative birefringence
- ☐ E: rhomboid with positive birefringence

Correct answer: E

Explanation

Calcium pyrophosphate crystals cause pseudogout, and are seen on microscopy as positively birefringent rhomboid crystals. Gout crystals are needle-shaped with negative birefringence.

Question 69

A 70-year-old man presented with a 2-week history of persistent fever. Six weeks previously, he had undergone colonoscopy and biopsy for a suspected carcinoma of the colon, and was awaiting surgery. He had a history of moderate mitral regurgitation caused by mitral valve prolapse.

Investigations:

echocardiogram	a vegetation on the anterior leaflet of the mitral valve
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What is the most likely causative organism?

Question 69

- ☐ A: *Bartonella henselae*
- ☐ B: *Staphylococcus aureus*
- ☐ C: *Streptococcus bovis*
- ☐ D: *Streptococcus viridans*
- ☐ E: *Yersinia enterocolitica*

Correct answer: C

Explanation

C: is the best answer. *Streptococcus bovis* endocarditis is classically associated with colonic carcinoma and adenoma, and also with chronic liver disease.

A: *Bartonella henselae* causes cat scratch fever, and most patients with this uncommon form of endocarditis will have had exposure to cats.

B: *Staphylococcus aureus* is an increasingly common cause of endocarditis, often seen in patients with early endocarditis following heart valve surgery, as well as in patients with a history of intravenous drug use, or with indwelling cannulae such as dialysis lines.

D: *Streptococcus viridians* endocarditis is the commonest cause of native valve endocarditis but is a less likely cause than *S. bovis* in this scenario.

E: *Yersinia enterocolitica* endocarditis is rare in comparison with options B, C and D.

Question 70

A 75-year-old woman presented with a 2-month history of generalised malaise and headaches that had disturbed her sleep. For the past 24 hours, she had been unable to see with her right eye. She had a past medical history of glaucoma and was using regular timolol eye drops.

On examination of the fundus, there was a swollen, pale right optic disc and a normal left optic disc.

What is the most likely diagnosis?

Question 70

- ☐ A: central retinal vein occlusion
- ☐ B: closed-angle glaucoma
- ☐ C: giant cell arteritis
- ☐ D: optic neuritis
- ☐ E: raised intracranial pressure

Correct answer: C

Explanation

The clinical picture suggests a right ischaemic optic neuropathy. The pain and malaise in someone of this age would be highly suggestive of an arteritic process and giant cell arteritis should be suspected in all cases presenting in this manner.

Question 71

A 66-year-old man, who was undergoing maintenance haemodialysis through a subcutaneous tunnelled catheter, presented with fever, chills and rigors during haemodialysis.

On examination, his temperature was 38.6°C, his pulse was 105 beats per minute and his blood pressure was 100/60 mmHg. Examination of his respiratory and cardiovascular systems was normal.

What is the most likely cause of his infection?

Question 71

- ☐ A: *Escherichia coli*
- ☐ B: *Pseudomonas aeruginosa*
- ☐ C: *Staphylococcus epidermidis*
- ☐ D: *Streptococcus pneumoniae*
- ☐ E: *Streptococcus viridans*

Correct answer: C

Explanation

Staphylococcus epidermidis or coagulase-negative staphylococcal infections are common infections with vascular dialysis catheters. The other options are unusual.

Question 72

A 72-year-old woman with rheumatoid arthritis presented with dysuria, rigors and high fever of 2 days' duration. Her regular medication comprised methotrexate, prednisolone and paracetamol.

On examination, her temperature was 39.0°C and she was tender in both flanks. Her body mass index was 34 kg/m² (18–25).

Investigations:

urine culture	coliforms, sensitive to ciprofloxacin
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Which condition is most likely to be precipitated by the use of ciprofloxacin?

Question 72

- ☐ A: gastric ulceration
- ☐ B: glucose intolerance
- ☐ C: hepatitis
- ☐ D: pneumonitis
- ☐ E: tendinopathy

Correct answer: E

Explanation

Tendon damage including rupture can occur rarely after use of quinolones. Quinolones are contraindicated in patients with a history of tendon disorders related to quinolone use.

Question 73

A 35-year-old woman presented with a 6-month history of episodes of sweating, joint pain and headaches.

On examination, her blood pressure was 160/90 mmHg. A clinical diagnosis of acromegaly was suspected.

Investigations:

fasting plasma glucose	8.1 mmol/L (3
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What additional investigation is most likely to confirm the diagnosis?

Question 73

- ☐ A: fasting growth hormone
- ☐ B: growth hormone suppression test
- ☐ C: insulin-like growth factor 1
- ☐ D: insulin tolerance test
- ☐ E: MR scan of pituitary

Correct answer: B

Explanation

Failure of growth hormone levels to be suppressed on a growth hormone suppression test indicates excess production. Growth hormone is released in a pulsatile manner, therefore an isolated sample is not appropriate, Insulin-like growth factor 1 levels are not diagnostic, insulin tolerance test assesses growth hormone deficiency and an MR scan of pituitary will not reveal growth hormone excess.

Question 74

A 25-year-old man presented with a 3-month history of hearing two people commenting on his actions. For the past 2 years, he had become increasingly withdrawn and had neglected his self-care. He had graduated from university at 21 years of age, but had never been employed and had few friends. He had taken an overdose of paracetamol 2 months previously. He had smoked cannabis regularly for 5 years. He drank 60 units of alcohol per week.

On examination, he made poor eye contact and his speech was disjointed.

What is the most likely diagnosis?

Question 74

- ☐ A: alcoholic hallucinosis
- ☐ B: borderline personality disorder
- ☐ C: cannabis-induced psychosis
- ☐ D: paranoid schizophrenia
- ☐ E: psychotic depression

Correct answer: D

Explanation

Diagnosis of schizophrenia is supported by first rank symptoms (voices discussing him), social withdrawal and neglect (negative symptoms) and the patient's age and time course. Disjointed speech reflects thought disorder, also found in schizophrenia. Alcoholic hallucinosis is rare and occurs after years of very heavy alcohol use. The finding of graduating from university and then declining is against any form of personality disorder which would have been developing through childhood and adolescence. Psychotic depression is unlikely due to evidence for schizophrenia and, in psychotic depression, voices tend to be very simple and elemental (noises or occasional words). While cannabis use is associated with schizophrenia, a pure cannabis-related psychosis would tend to be more acute and he has been using cannabis for 5 years.

Question 75

A 42-year-old man with a 20-year history of ulcerative colitis was advised that he was at increased risk of developing cancer of the colon. He was taking sulfasalazine with intermittent courses of corticosteroids for acute exacerbations. He had also tried various diets in the past, including a lactose-free diet and a low-fibre diet.

What factor is most likely to increase his risk of developing cancer of the colon?

Question 75

- ☐ A: chronic colonic inflammation
- ☐ B: he is likely to be a carrier for the caspase recruitment domain-containing protein 15 (CARD 15) gene mutation
- ☐ C: he is likely to have the APC (adenomatous polyposis coli) gene
- ☐ D: long-term immunosuppression
- ☐ E: reduced intake of dietary fibre

Correct answer: A

Explanation

This is a man with a longstanding history of inflammatory bowel disease. The history makes clear that he has required a number of interventions to control symptoms which indicates that he has chronic inflammation of his bowel.

The presence and severity of chronic bowel inflammation is an accepted and strong risk factor for the development of colorectal cancer (answer A). This has been demonstrated in a number of epidemiological studies. The use of long-term immunosuppression (answer D) may in fact reduce the risk of colorectal cancer by reducing the bowel inflammation. A low-fibre diet may be recommended during periods of exacerbation of bowel inflammation, although is not considered to contribute to an increased risk of cancer in this setting.

CARD 15 (previously known as NOD2) is a recognised susceptibility gene for Crohn's disease. The link with colorectal cancer and ulcerative colitis is less clear.

The APC gene (answer C) encodes a tumour suppressor protein. This gene is mutated in those with familial adenomatous polyposis. This is a predisposing condition to colorectal cancer. This may be relevant if it was stated that there was a family history of colorectal cancer in a first-degree relative; however, this information is not given and so it is not likely that the APC gene is relevant to this question.

Question 76

A 63-year-old woman with a history of CREST syndrome developed progressive breathlessness.

On auscultation of the chest, she had bilateral basal crackles.

Investigations:

chest X-ray	lower zone shadowing
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What is the most likely diagnosis?

Question 76

- ☐ A: cryptogenic organising pneumonia
- ☐ B: interstitial lung disease
- ☐ C: left ventricular failure
- ☐ D: progressive massive fibrosis
- ☐ E: tuberculosis

Correct answer: B

Explanation

Patients with autoimmune disease develop interstitial lung disease, usually non-specific interstitial pneumonitis (NSIP). The other conditions are not associated with CREST syndrome, although immunosuppressed patients can develop cryptogenic organising pneumonia or get reactivation of tuberculosis.

Question 77

A 75-year-old woman with hypertension had been treated with bendroflumethiazide for the past 5 years.

On examination, her blood pressure was 125/78 mmHg.

Investigations:

serum sodium	140 mmol/L (137–144)
serum potassium	3.2 mmol/L (3.5–4.9)
serum creatinine	67 µmol/L (60–110)

What is the most likely mechanism for the hypokalaemia?

Question 77

- ☐ A: increased loss in the distal tubule
- ☐ B: increased potassium secretion in the proximal tubule
- ☐ C: opening of potassium channels in the principal cells
- ☐ D: reduced aldosterone secretion
- ☐ E: reduced potassium reabsorption in the loop of Henle

Correct answer: A

Explanation

Thiazide diuretics act on the distal tubule by blocking the thiazide-sensitive Na^+ - Cl^- symporter. The increased sodium delivery to the distal part of the distal tubule causes increased potassium loss, due to stimulation by sodium of the aldosterone-sensitive sodium pump, thereby enhancing sodium reabsorption in exchange for potassium (and hydrogen) ion.

Question 78

A 25-year-old intravenous drug user presented with an injection site abscess.

On examination, his temperature was 38.5°C and there was a pansystolic murmur.

What organism is most likely to be cultured from both the abscess and the blood?

Question 78

- ☐ A: *Clostridium novyi*
- ☐ B: *Klebsiella pneumoniae*
- ☐ C: *Staphylococcus aureus*
- ☐ D: *Staphylococcus epidermidis*
- ☐ E: *Streptococcus viridans*

Correct answer: C

Explanation

A straightforward test of knowledge. The patient has an injection site abscess and right-sided endocarditis. *Staphylococcus aureus* is the most likely cause of this presentation.

Question 79

A 30-year-old doctor presented following a needlestick injury sustained while treating a patient with recently diagnosed HIV infection. The patient was hepatitis C negative and had been vaccinated against hepatitis B virus, and was taking no antiretroviral treatment.

What is the most appropriate post-exposure prophylaxis for the doctor?

Question 79

- ☐ A: single-drug antiretroviral treatment for 1 month
- ☐ B: single-drug antiretroviral treatment for 3 months
- ☐ C: three-drug antiretroviral treatment for 1 month
- ☐ D: three-drug antiretroviral treatment for 3 months
- ☐ E: two-drug antiretroviral treatment for 1 month

Correct answer: C

Explanation

Post-exposure prophylaxis (PEP) of HIV requires a three-drug antiretroviral regimen in the same way that treatment requires three drug regimens. All of the trials of PEP in needlestick injury have been done with 28 days of treatment and this is established practice.

Question 80

A 21-year-old woman, undergoing chemotherapy for non-Hodgkin's lymphoma, was in contact with her nephew for 2 hours on the day that he developed a chickenpox rash.

Investigations:

varicella serology	negative
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What is the most appropriate management?

Question 80

- ☐ A: advise her to seek treatment if she develops a chickenpox rash
- ☐ B: interrupt chemotherapy for 2 weeks
- ☐ C: oral aciclovir 800 mg five times daily for 1 week
- ☐ D: varicella immunisation
- ☐ E: varicella zoster immunoglobulin

Correct answer: E

Explanation

E. The patient is immunocompromised and with negative varicella serology at risk of varicella infection. Varicella zoster immunoglobulin transfers passive immunity and reduces the risk of acquiring infection.

A. If she develops chickenpox there is a high risk of adverse outcome and management cannot wait until she develops chickenpox.

B. Interrupting chemotherapy will make no difference to outcome.

C. Chickenpox in an immunocompromised host is always treated intravenously. Oral aciclovir cannot prevent chickenpox.

D. Varicella immunisation is contraindicated because it is a live vaccine.

Question 81

A 21-year-old woman presented with watery diarrhoea and cramping abdominal pain, 5 days after arriving in Mexico.

On examination, her temperature was 37.8°C and there was mild abdominal tenderness. There was some mucus in the stools, but no blood.

What is the most likely pathogen?

Question 81

- ☐ A: *Aeromonas hydrophila*
- ☐ B: *Entamoeba histolytica*
- ☐ C: *Escherichia coli*
- ☐ D: *Giardia lamblia*
- ☐ E: rotavirus

Correct answer: C

Explanation

Bacteria are the most common cause of Travellers' diarrhoea. Overall, the most common pathogen is enterotoxigenic *Escherichia coli*, followed by *Campylobacter jejuni*, *Shigella* spp., and *Salmonella* spp. Therefore the answer is C: *Escherichia coli* (enterotoxigenic) because it is the most likely cause of the presentation.

A, B, D and E can all cause diarrhoeal illness, although rotavirus would be unlikely in adults and *Entamoeba histolytica* would usually be bloody

Question 82

A 36-year-old HIV-positive man presented with a 1-week history of generalised pruritus. He had had unprotected anal sex 2 months previously while on holiday in Spain. He had previously been vaccinated against hepatitis B virus, with an adequate antibody response.

On examination, his temperature was 37.8°C and he was jaundiced. Examination was otherwise normal.

Investigations:

CD4 count	550 × 10 ⁶ /L (43
serum total bilirubin	99 µmol/L (1–22
serum aspartate aminotransferase	754 U/L (1–31)
serum alkaline phosphatase	173 U/L (45–10
anti-hepatitis A IgM antibody	negative

What is the most likely diagnosis?

Question 82

- ☐ A: acute hepatitis C
- ☐ B: acute hepatitis D
- ☐ C: cytomegalovirus infection
- ☐ D: syphilis

☐ E: toxoplasmosis

Correct answer: A

Explanation

The patient has acute hepatitis. Hepatitis C is the most likely cause in a patient with HIV who has had unprotected anal sex. Hepatitis C is sexually transmitted in these circumstances. Hepatitis D is only clinically active when co-infected with hepatitis B.

Cytomegalovirus, syphilis and toxoplasmosis can all cause hepatitis but are less likely in this clinical context.

Question 83

Twenty-six passengers on a cruise ship returning from the Mediterranean to Southampton developed acute gastrointestinal illness over a period of 24 hours. All those affected had experienced persistent vomiting and watery diarrhoea.

What is the most likely causative agent?

Question 83

- ☐ A: *Campylobacter jejuni*
- ☐ B: *Escherichia coli* O157
- ☐ C: norovirus
- ☐ D: rotavirus
- ☐ E: *Salmonella enteritidis*

Correct answer: C

Explanation

Norovirus is the most common cause of viral gastroenteritis. It is transmitted by faecally contaminated food or water, by person-to-person contact, and via aerosolisation of vomited virus and subsequent contamination of surfaces. Outbreaks in cruise ships are common.

A, B and E pass less easily from person to person and are less likely to cause an outbreak on a cruise ship. Rotavirus is most common in children

Question 84

A 52-year-old man presented after having been found unconscious in the street.

On examination, he had a Glasgow coma score of 5, a pulse of 110 beats per minute and a blood pressure of 95/65 mmHg. His respiratory rate was 35 breaths per minute and there were no focal neurological signs.

Investigations:

arterial blood gases, breathing 40% oxygen:	
PO ₂	11.5 kPa
PCO ₂	3.9 kPa (4.7–6.0)
pH	7.24 (7.35–7.45)
H ⁺	58 nmol/L (35–45)
serum bicarbonate	12 mmol/L (21–29)

What acid–base disturbance is most likely to be present?

Question 84

- ☐ A: metabolic acidosis
- ☐ B: mixed metabolic acidosis and metabolic alkalosis
- ☐ C: mixed metabolic acidosis and respiratory acidosis
- ☐ D: mixed respiratory alkalosis and metabolic acidosis

☐ E: respiratory acidosis

Correct answer: A

Explanation

There is an elevated H^+ therefore this is acidosis. The low bicarbonate and low PCO_2 both support a metabolic acidosis (i.e. not a respiratory acidosis due to CO_2 retention). There is no indication of mixed causes for acidosis.

Question 85

A 33-year-old man presented with a 6-month history of cough and breathlessness that tended to deteriorate as the week progressed and improve when he went on holiday. He was a lifelong non-smoker and worked as a paint sprayer in a car factory.

Investigations:

chest X-ray	n
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What further investigation would be most useful in establishing a diagnosis?

Question 85

- ☐ A: cardiorespiratory exercise test
- ☐ B: histamine challenge
- ☐ C: IgE antibody to isocyanate
- ☐ D: serial peak expiratory flow rate measurements
- ☐ E: transfer factor for CO (TL_{CO})

Correct answer: D

Explanation

The presentation suggests occupational asthma. Serial peak flow measurements would be helpful in determining that his symptoms are worse at work with corresponding drop in the peak flow. The other tests will not necessarily show a link to his work.

Question 86

A 54-year-old right-handed woman following the sudden onset of difficulty in reading.

Investigations:

CT scan of head	a recent left parietal lobe infarct
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What additional feature is most likely to be present?

Question 86

- ☐ A: acalculia
- ☐ B: confabulation
- ☐ C: cortical deafness
- ☐ D: expressive dysphasia
- ☐ E: homonymous hemianopia

Correct answer: A

Explanation

Dominant parietal lobe lesions can cause a variety of problems including receptive dysphasia, dyslexia, inattention and sensory impairments, but also the so-called 'Gerstmann's syndrome' which is characterised by: finger agnosia, acalculia, agraphia and left-right limb disorientation.

Question 87

A 37-year-old woman with breast cancer had a family history of breast and ovarian cancer. Molecular genetic testing revealed a BRCA1 mutation.

What is the normal function of BRCA1?

Question 87

- ☐ A: angiogenesis
- ☐ B: apoptosis
- ☐ C: cell adhesion
- ☐ D: promotion of mitosis
- ☐ E: tumour suppression

Correct answer: E

Explanation

BRCA1 is a tumour suppressor gene, involved in DNA repair.

Question 88

A 32-year-old woman presented with a 2-day history of fever and myalgia and a 6-hour history of headache, photophobia and neck stiffness.

Investigations:

white cell count	10.4 × 10 ⁹ /L (4.0–11.0)
random plasma glucose	5.2 mmol/L
cerebrospinal fluid:	
opening pressure	180 mmH ₂ O (120–250)
total protein	0.60 g/L (0.15–0.45)
glucose	3.5 mmol/L (3.3–4.4)
cell count	76/μL (≤5)
lymphocyte count	46/μL (≤3)
neutrophil count	30/μL (0)

What is the most likely causative organism?

Question 88

- ☐ A: enterovirus
- ☐ B: *Listeria monocytogenes*
- ☐ C: *Mycobacterium tuberculosis*
- ☐ D: *Neisseria meningitidis*

☐ E: Streptococcus pneumoniae

Correct answer: A

Explanation

A: The cerebrospinal fluid (CSF) values are most in keeping with viral meningitis and enterovirus is the most probable cause. It is probably early viral meningitis given that neutrophils are seen in addition to lymphocytes.

B: She has no risk factors for listeria. The CSF in listeria shows high protein and low glucose and lymphocytosis.

C: The CSF in tuberculous meningitis shows very high protein and low glucose and lymphocytosis.

D and E: The CSF in Neisseria meningitides and Streptococcus pneumoniae shows high protein and low glucose (<50% plasma) and a very high neutrophil count.

Question 89

A clinical trial compared medical versus surgical treatment for stable angina. A large number of patients withdrew from the study.

What type of analysis should be used to estimate the likely benefits in similar groups of patients in future?

Question 89

- ☐ A: intention-to-treat
- ☐ B: meta-analysis
- ☐ C: on-treatment
- ☐ D: post-hoc
- ☐ E: sensitivity

Correct answer: A

Explanation

Intention-to-treat is a common method of analysis in randomised trials and considered good practice. The outcomes of those who withdrew are included in the final analysis according to the arm of the trial to which they were originally assigned.

Question 90

A 46-year-old man presented within 1 hour of ingesting 40 tablets of slow-release theophylline.

What is the most appropriate initial management?

Question 90

- ☐ A: activated charcoal
- ☐ B: alkaline diuresis
- ☐ C: gastric lavage
- ☐ D: observation only
- ☐ E: whole bowel irrigation

Correct answer: A

Explanation

Activated charcoal given within 1 hour adsorbs theophylline and reduces its absorption. Multiple doses of activated charcoal may also be given to enhance the elimination of theophylline.

Question 91

A 20-year-old woman presented 24 hours after taking an overdose of 80 tablets of levothyroxine 100 micrograms.

On examination, she was clinically euthyroid.

What is the most appropriate treatment?

Question 91

- ☐ A: β -adrenoceptor blockade
- ☐ B: forced alkaline diuresis
- ☐ C: haemodialysis
- ☐ D: no treatment required
- ☐ E: stomach washout

Correct answer: D

Explanation

This patient presented late following a levothyroxine overdose and she remained asymptomatic and did not develop any complications; therefore, no treatment was required

Question 92

A 27-year-old woman presented with a 4-hour history of severe shortness of breath and was found to have features of acute asthma. She had a past history of repeated attendances for acute exacerbations of asthma.

What finding would indicate that this exacerbation of her asthma should be regarded as life-threatening?

Question 92

- ☐ A: $P_a\text{CO}_2$ of 5.5 kPa
- ☐ B: $P_a\text{O}_2$ of 8.4 kPa
- ☐ C: peak flow 35% predicted
- ☐ D: pulse 114 beats per minute
- ☐ E: respiratory rate 30 breaths per minute

Correct answer: A

Explanation

Patients with severe asthma get tired and start hypoventilating. As a result, the CO_2 starts going up. Therefore, even though it is in the normal range, this is the most worrying result. The others are also features of severe asthma

Question 93

An 80-year-old woman presented with a 6-month history of progressive breathlessness.

On examination, her chest was normal, but there was a large goitre.

Which investigation is most useful to determine whether the goitre is the cause of her breathlessness?

Question 93

- ☐ A: bronchoscopy
- ☐ B: CT scan of neck and chest
- ☐ C: forced vital capacity
- ☐ D: respiratory flow-volume loop
- ☐ E: X-ray of thoracic inlet

Correct answer: D

Explanation

Pulmonary function tests are the most sensitive indicator of goitre being the cause of her breathlessness. The flow-volume loop will show marked reduction of the peak inspiratory and expiratory flow, unlike most pulmonary causes of breathlessness. Her vital capacity will not be affected by the presence of goitre. Bronchoscopy, CT scan and X-ray of thoracic inlet may have other uses in the diagnostic pathway but will not be the best way to confirm that it is the goitre causing breathlessness.

Question 94

A 59-year-old man was found to have a squamous cell lung carcinoma in his right upper lobe. He was a smoker and reported breathlessness on modest exertion. He also complained of chronic back pain.

Investigations:

forced expiratory rate in 1 s	3.2 L (83% predicted)
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What is the most useful next investigation in assessing his suitability for surgical resection?

Question 94

- ☐ A: bone scan
- ☐ B: bronchoscopy
- ☐ C: cardiopulmonary exercise testing
- ☐ D: PET-CT scan
- ☐ E: ventilation/perfusion isotope lung scan

Correct answer: D

Explanation

PET scan is essential in accurate staging. It will show FDG uptake in lymph nodes and also may show distant metastases which would mean that the patient is not suitable for radical treatment. It is an essential investigation before surgical resection of lung cancer.

Question 95

A 58-year-old man was seen with progressive breathlessness in the outpatient clinic. He had undergone coronary artery bypass grafting 3 years previously and this had been complicated by a resternotomy for tamponade. He recovered well but had started to feel breathless and fatigued over the past 12 months. His past medical history included type 2 diabetes mellitus and hypertension. He was a current smoker.

A diagnosis of constrictive pericarditis was made.

What is the most common physical finding seen in this group of patients?

Question 95

- ☐ A: ascites
- ☐ B: finger clubbing
- ☐ C: hepatomegaly
- ☐ D: pericardial knock
- ☐ E: pleural effusion

Correct answer: C

Explanation

C is the best answer. Hepatomegaly is the earliest and most consistent feature of pericardial constriction of the options here.

A: ascites (a later phenomenon than hepatomegaly) and D: pericardial knock (recognised in around 50% of cases) are also features of pericardial constriction, making this a true "best-of" question.

B: Finger clubbing is not a feature of constriction, however, and E: pleural effusion is uncommon.

Question 96

A 22-year-old woman presented with acute chest pains, 2 days after the uncomplicated delivery of her first child, and was found to have an anterior ST-elevation myocardial infarction. She had no conventional risk factors for coronary artery disease.

What is the most likely aetiology of her myocardial infarction?

Question 96

- ☐ A: atherosclerotic plaque rupture
- ☐ B: coronary artery dissection
- ☐ C: myocardial bridging
- ☐ D: paradoxical embolism across patent foramen ovale
- ☐ E: takotsubo cardiomyopathy

Correct answer: B

Explanation

B is the best answer. Coronary artery dissection is a well-recognised cause of myocardial infarction in relation to pregnancy. It is the most likely cause in this young patient who is in the early post-partum phase, and who has no recognised risk factors for coronary atherosclerosis..

A: Atherosclerotic plaque rupture is the main alternative to coronary dissection here, and would still need to be excluded, given that it is much the commonest cause of myocardial infarction otherwise.

C: Myocardial bridging is a rare cause of myocardial ischaemia or infarction, as it causes coronary constriction during ventricular systole, whereas coronary blood flow is mainly diastolic.

D: Paradoxical embolism across patent foramen ovale is a rare though well-recognised cause of myocardial infarction, and may be more prevalent during pregnancy which is a hypercoagulable state.

E: Takotsubo cardiomyopathy is also recognised during and after pregnancy, but is rarer than options A or B.

Question 97

A 74-year-old man presented following an episode of severe rectal bleeding. He was normally fit and well and had had no previous problems with his bowels.

On examination, he was pale. His pulse was 110 beats per minute and his blood pressure was 100/60 mmHg. Abdominal examination was normal. Rectal examination showed fresh blood on the glove.

Investigations:

haemoglobin	85 g/L (130–180)
white cell count	$7.5 \times 10^9/\text{L}$ (4.0–11.0)

What is the most likely diagnosis?

Question 97

- ☐ A: bleeding diverticulum
- ☐ B: carcinoma of colon
- ☐ C: colonic polyp
- ☐ D: haemorrhoids
- ☐ E: inflammatory bowel disease

Correct answer: A

Explanation

The most common cause of such heavy bleeding in a 74-year-old is diverticular disease related. It is very unusual for cancer and polyps to bleed so heavily and there often is a preceding history of bleeding. Likewise, haemorrhoidal bleeding rarely causes haemodynamic instability. Inflammatory bowel disease very unusually leads to such heavy bleeding and there will often be a preceding history of symptoms.

Question 98

A 56-year-old woman with hypertension was found to have abnormal liver function tests when she attended for routine review. She was taking bendroflumethiazide, ramipril and simvastatin.

On examination, her body mass index was 30 kg/m² (18–25).

Investigations:

serum total bilirubin	15 µmol/L (1–22)
serum alanine aminotransferase	65 U/L (5–35)
serum aspartate aminotransferase	75 U/L (1–31)
serum alkaline phosphatase	305 U/L (45–105)
serum gamma glutamyl transferase	150 U/L (4–35)

What investigation is most likely to establish the liver diagnosis?

Question 98

- ☐ A: antimitochondrial antibodies
- ☐ B: CT scan of abdomen
- ☐ C: ferritin
- ☐ D: MRCP
- ☐ E: ultrasound scan of abdomen

Correct answer: A

Explanation

Antimitochondrial antibodies are present in over 90% of patients with primary biliary cirrhosis (PBC). The pattern of deranged liver function tests is cholestatic and likely indicates PBC. CT scan and MRCP are both unhelpful in diagnosing PBC as it mainly affects small bile ducts. Ferritin will be unhelpful as she is unlikely to have haemochromatosis. Ultrasound scan is indicated and helpful to exclude other associated abnormalities such as fatty liver. However, it is non-specific and will not establish a diagnosis.

Question 99

A 72-year-old man presented with a 3-month history of worsening neck and right arm pain radiating down the inner forearm, associated with numbness and tingling involving the index and middle fingers.

Examination of the right upper limb revealed reduced forearm pronation and wrist flexion, decreased sensation in the index and middle fingers, and diminished triceps tendon reflex.

What is the most likely site of the lesion?

Question 99

- ☐ A: axillary nerve
- ☐ B: C6 root
- ☐ C: C7 root
- ☐ D: median nerve
- ☐ E: radial nerve

Correct answer: C

Explanation

The description of symptoms and distribution of pain is consistent with a root rather than a single nerve lesion. Reduced wrist flexion (median and ulnar nerves, C6–T1), diminished triceps tendon reflex (C7) and diminished sensation in index and middle fingers (C6, C7) localises the lesion to C7 root.

Question 100

A 78-year-old woman presented with a 9-month history of worsening urinary frequency and urge incontinence.

Examination was normal.

Investigations:

post-void bladder scan	10-mL residual volume
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Antagonism of which neurotransmitter is most likely to improve her symptoms?

Question 100

- ☐ A: acetylcholine
- ☐ B: adrenaline
- ☐ C: dopamine
- ☐ D: noradrenaline
- ☐ E: serotonin

Correct answer: A

Explanation

Contraction of the bladder detrusor muscle is stimulated by acetylcholine. Anticholinergic agents inhibit the binding of acetylcholine to the cholinergic receptor, thereby suppressing involuntary bladder contraction of any aetiology.

Question 101

A 78-year-old woman presented with chronic induration of the skin of both legs. She had a history of chronic venous insufficiency and had previously been treated for venous ulceration.

On examination, she had bilateral reddish-brown skin pigmentation and an inverted champagne bottle appearance.

She was found to have lipodermatosclerosis.

What structure is implicated in the pathophysiology of this condition?

Question 101

- ☐ A: dermis
- ☐ B: hypodermis
- ☐ C: stratum basale
- ☐ D: stratum corneum
- ☐ E: stratum spinosum

Correct answer: B

Explanation

Lipodermatosclerosis or sclerosing panniculitis is an extensive induration of the skin, often in association with leg ulcers and most commonly related to venous hypertension; it is a chronic inflammation with fibrous tissue that involves and replaces the hypodermis and, if extensive, the papillary dermis.

Question 102

An 89-year-old woman presented with general deterioration and worsening mobility. She had vascular dementia, and a history of recent falls and urinary incontinence. She consumed 21 units of alcohol per week.

Her Waterlow score was 21/50.

Investigations:

serum albumin	30 g/L (37–49)
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Which parameter is most likely to have contributed to the patient's high Waterlow score?

Question 102

- ☐ A: alcohol consumption
- ☐ B: cognitive status
- ☐ C: continence
- ☐ D: history of recent falls
- ☐ E: serum albumin level

Correct answer: C

Explanation

The Waterlow score is a tool used to assess the risk of development of a pressure sore. It utilises the following parameters to risk-stratify the patient: body weight, nutritional status, continence, skin type, mobility, age and sex. It may be used both in an acute setting or in care homes.

Question 103

A 68-year-old man became acutely breathless following admission with a 2-week history of nausea, vomiting and diarrhoea. Despite fluid resuscitation, he had remained anuric 6 hours after admission.

On examination, his blood pressure was 104/63 mmHg, his jugular venous pressure was 10 cm above the sternal angle and his respiratory rate was 32 breaths per minute. He had bibasal respiratory crackles and pitting oedema in both ankles.

Investigations:

serum sodium	138 mmol/L (137–144)
serum potassium	5.6 mmol/L (3.5–4.9)
serum bicarbonate	12 mmol/L (20–28)
serum urea	29.0 mmol/L (2.5–7.0)
serum creatinine	640 µmol/L (60–110)

What is the most appropriate next step in management?

Question 103

- ☐ A: dopamine at renal dose
- ☐ B: furosemide
- ☐ C: haemodialysis
- ☐ D: insulin and glucose 5%
- ☐ E: sodium bicarbonate

Correct answer: C

Explanation

Haemodialysis is the right answer as he is already fluid overloaded. Furosemide will not work in this situation to cause a diuresis, and the other options are not feasible or have no therapeutic value given his pulmonary oedema.

Question 104

A 52-year-old woman presented with an episode of weakness of the left side of her face and left arm that resolved after 3 hours. She was otherwise well and had no significant past medical history.

On examination, her blood pressure was 110/75 mmHg.

Investigations:

ECG	atrial fibrillation with a rate of 110 beats/min
echocardiogram	structurally normal heart

Treatment was started with atenolol and warfarin.

She underwent a successful DC cardioversion 4 weeks later.

How long should she continue with warfarin therapy?

Question 104

- ☐ A: 4 weeks
- ☐ B: 6 months
- ☐ C: 1 year
- ☐ D: 3 years
- ☐ E: lifelong

Correct answer: E

Explanation

This woman has a history of transient ischaemic attack which puts her at high risk of recurrent embolic episodes even after a successful cardioversion. She would score 3 on the CHA₂DS₂-VASc score and anticoagulation should be considered lifelong following a discussion about stroke and bleeding risk.